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Emission Inventory Methodology for the West Oakland Diesel Particulate Matter Health Risk Assessments

INTRODUCTION

This document outlines the methodologies used to develop an emission inventory of diesel particulate matter (diesel PM) from sources at the maritime Port of Oakland (the Port), the Union Pacific (UP) rail yard and the community of West Oakland (the Community). The emission inventories will be used in a health risk assessment to estimate potential health impacts from diesel PM from the various sources related to the Port and significant sources within the Community.

MARITIME PORT OF OAKLAND EMISSIONS INVENTORY (Part 1)

The Air Resources Board (ARB) has worked collaboratively with representatives from the Maritime Port of Oakland (the Port) and their consultants, Environ International Corporation (Environ) and with Bay Area Air Quality Management District (BAAQMD) staff, in developing the emissions inventory for the Port. The inventory includes emissions for the following categories:

- Ocean Going Vessels, Main and Auxiliary
- Commercial Harbor Craft
- Cargo Handling Equipment
- Locomotive
- Trucking (Container transport)

Attachment A contains the portions of Environ's draft methodology report that discusses the preliminary approach to developing the inventory with ARB's initial revisions noted at the end of each section. An updated version which incorporates final revisions will be released at a later date.

UNION PACIFIC RAILYARD (Part 2)

The Union Pacific (UP) rail yard emission inventory is being developed pursuant to the ARB/Railroad Statewide Agreement. A copy of the rail yard methodology is included as Attachment B and is available on the web at: http://www.arb.ca.gov/railyard/hra/071806hra_eim.pdf

WEST OAKLAND COMMUNITY (Part 3)

To develop the emissions inventory for the West Oakland community, the ARB is working with the BAAQMD staff. Together, the ARB and BAAQMD staffs, with

input from community members in West Oakland, are working to identify the most significant sources of diesel PM in the community. The sources identified and methodology for the emission inventory for each of these sources are discussed below.

Freeways and Primary Roads

Sources and Modeling Domain:

- Diesel heavy duty trucks on Freeways 80, 580, 880, and 980, Bay Bridge Toll Plaza, and the direct arterials between port or rail yards and the freeways.

Data Sources:

- Truck activity (e.g., volume, speed, and link length) will be taken from the Integrated Transportation Network (ITN), which is a compilation of available information from travel modeling networks used throughout California. More information is available at: http://www.arb.ca.gov/airways/CCOS/docs/III3_0402_Jun06_fr.pdf
- Truck age distribution and vehicle fraction are based on EMFAC county defaults. In the future, the ARB may further refine the inventory with additional data on port truck specific age distributions and vehicle fractions.
- Several studies focused on truck activity in the community of West Oakland have been conducted over the past several years by the Pacific Institute, City of Oakland, BAAQMD, and other organizations. These data will be collected and used to update information representing West Oakland in the ITN.
- Caltrans maintains a freeway performance measurement system, referred to as PeMS. PeMS data are collected from embedded sensors in roadways throughout the state. The PeMS database provides information about the number and speed of trucks and cars traveling past each roadway sensor. These data will also be used to update information representing West Oakland in the ITN. More information is available at: http://pems.eecs.berkeley.edu/
- Truck trips generated by the Port will be assessed through Part 1 of the risk assessment; truck trips generated by the Union Pacific (UP) rail yard will be assessed through Part 2 of the risk assessment. Results from these studies will be used to evaluate the likely route of travel for these trucks, and to ensure the updated ITN data used for Part 3 capture these trucks.
- Using EMFAC, ARB and BAAQMD can estimate the total amount of idling emissions likely to occur in the community. This estimate will be rough, but can be used to provide a starting point for assessing idling emissions. Information from the Port (Part 1), UP rail yard (Part 2), and studies about distribution centers in the community (BAAQMD-Part 3) will be used to revise this estimate and help inform estimates of where these emissions are generated. More information: http://www.arb.ca.gov/msei/msei.htm

DRAFT

Off-Port Commercial Harborcraft Activity and Emissions

Sources:

- Commercial harborcraft operating in the San Francisco Bay that are not covered as part of the Port risk assessment (Part 1).

Methodology includes:

- ARB is developing an updated statewide emissions inventory for commercial harborcraft in advance of a proposed regulation. For more information please see: http://arb.ca.gov/msprog/offroad/marinevess/harborcraft.htm
- This inventory is based on surveys ARB conducted as well as other information collected from the Ports of Los Angeles, Long Beach, and other sources.
- The inventory covers tug boats, tow boats, pilot boats, ferries, and other vessel types.
- ARB staff will allocate these emissions spatially in the San Francisco Bay, and subtract any emissions covered by the Port risk assessment (Part 1).

Off-Port Ocean-Going Vessel Activity and Emissions

Sources and Modeling Domain:

- Ocean-going vessel operations within the San Francisco Bay, excluding emissions associated with the Port risk assessment (Part 1).

Data Sources:

- ARB has developed a comprehensive statewide emissions inventory, which integrates available information from many different sources. For more information, please see: http://arb.ca.gov/regact/marine2005/appd.pdf and http://arb.ca.gov/msprog/offroad/marinevess/marinevess.htm
- Ocean-going vessels include container ships, tankers, bulk carriers, and other vessel types. The emissions inventory uses a state-of-the-art geographic information system, coupled with information from various government agencies about where each individual vessel traveled in 2004, and characteristics of those vessels including engine size and other factors affecting emissions.
- ARB staff will allocate emissions spatially in the San Francisco Bay using information about shipping lanes within the Bay. Emissions associated with the Port risk assessment (Part 1) will be excluded from the Part 3.

Off-Rail Yard Train Activity

Sources:

- All freight, inter-modal, mixed, and passenger trains operating in the modeling domain, outside of the Port, UP rail yard, and AMTRAK station.

Methodology includes:

- Using information about the number and composition of trains leaving the Port (Part 1), UP rail yard (Part 2), and AMTRAK system schedules, ARB staff will estimate the number of train trips traveling on each stretch of

track within the modeling domain. Note that BNSF rail yard is on Port property. Emissions are included with the Port (Part 1).
- ARB staff will estimate emissions using our current emissions inventory representing locomotives. More information about this methodology is available at: http://arb.ca.gov/msprog/offroad/loco/loco.htm and http://www.arb.ca.gov/msei/offroad/techmemo/locomotive_memo_2.pdf and ftp://ftp.arb.ca.gov/carbis/reports/l343.pdf.
- Locomotive emission factors consistent with methods for Parts 1 and 2.

Mobile Source Emissions at Facilities in West Oakland

Sources:
- Truck idling, movement, and associated mobile source emissions within facilities in West Oakland that generate truck trips.
- Emissions estimates focused on truck idling and movement; off-road sources where are identified and significant.
- Facility types include distribution centers as well as other facility types which may generate truck trips including wholesalers, recycling facilities, and others. This methodology also covers the Post Office and Greyhound Bus Station.

Methodology includes:
- BAAQMD is funding a study which is being conducted by Sonoma Technologies, Inc. to identify and quantify emissions from these sources.
- Methodology specifics are in development; however, District and it's contractors to conduct on-site surveys of distribution centers to determine truck activity & idling; activity of stationary/portable engines; and other off-road equipment.
- Emissions will be calculated using EMFAC and OFFROAD. For more information, please see: http://www.arb.ca.gov/msei/msei.htm.

Stationary Sources of Diesel PM in West Oakland

Sources:
- East Bay Municipal Utilities District – sewage treatment plant.
- Duke Energy – power plant.
- Other significant stationary sources.

Methodology includes:
- Facility data and emissions estimates will be taken from District databases representing permitted facilities.
- District and ARB staff will identify sources to be included in the HRA. Selection will be based on factors including, but not limited to, magnitude of emissions, location of the source, proximity of residences, release parameters, and the timing of emissions during the day.
- For significant sources, the District will develop more precise spatial coordinates than currently exist in the District database.

Schnitzer Steel

Sources:

- Vessels, diesel cargo equipment, and stationary engines on Schnitzer property.

Methodology includes:

- ARB and District to use District permits, cargo surveys, vessel inventory.
- Survey of on-site activity by ARB or District and it's contractors to be determined.

Construction Activity

Sources:

- Heavy diesel equipment and marine support for Bay Bridge and other construction projects in the West Oakland domain.

Methodology includes:

- Under contract to BAAQMD, Sonoma Technologies Inc. will evaluate available Environmental Impact Report data covering emissions associated with construction equipment in West Oakland.
- Emissions estimates will be checked for quality and supplemented with surveys if necessary.

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